WHAT IS CLAIMED IS:

1. A method of making and using a reformable tool having a surface portion characterized by a desired shape, the method comprising:

providing a volume of a mixture in a formable state, the mixture having solid and liquid-containing carrier components wherein

the solid component comprises a plurality of solid bodies, and

the carrier component fills the interstices between the bodies, and includes an excess amount of carrier beyond an amount that would be needed to fill the interstices when the bodies are packed, the excess amount of carrier thus allowing the mixture to be in the formable state;

causing a surface of the volume to assume the desired shape;

extracting the excess amount of carrier to cause the mixture to transition from the formable state to a stable, force-resisting state where the bodies make nested, packed, interlocking or otherwise stable consolidated contact so that a portion of the volume has a stable surface portion characterized by the desired shape;

subsequently conforming a body of formable material to the stable surface portion of the volume in order to impart a shape to the body of formable material that is complementary to the desired shape;

subsequently stabilizing the body of formable material so that the body retains the shape that is complementary to the desired shape; and

subsequently reintroducing a sufficient volume of carrier to allow the mixture to transition from the stable, force-resisting state to the formable state.

2. The method of claim 1 wherein the carrier is a froth.

3. The method of claim 1 wherein:

the carrier is a state-change liquid; and

the method further includes, after extracting the excess amount of carrier, solidifying the carrier.

4. The method of claim 1 wherein the carrier is a liquid that maintains its liquid state throughout the conforming and stabilizing.

5. A method of making and using a reformable tool having a surface portion characterized by a desired shape, the method comprising:

providing a volume of a mixture in a formable state, the mixture having solid and liquid components wherein

the solid component comprises a plurality of solid bodies, and

the liquid component fills the interstices between the bodies, and includes an excess amount of liquid beyond an amount that would be needed to fill the interstices when the bodies are packed, the excess amount of liquid thus allowing the mixture to be in the formable state;

causing a surface of the volume to assume the desired shape;

extracting the excess amount of liquid to cause the mixture to transition from the formable state to a stable, force-resisting state where the bodies make nested, packed, interlocking or otherwise stable consolidated contact so that a portion of the volume has a stable surface portion characterized by the desired shape;

subsequently conforming a body of formable material to the stable surface portion of the volume in order to impart a shape to the body of formable material that is complementary to the desired shape;

subsequently stabilizing the body of formable material so that the body retains the shape that is complementary to the desired shape; and

subsequently reintroducing a sufficient volume of liquid to allow the mixture to transition from the stable, force-resisting state to the formable state.

6. The method of claim 2 wherein said causing a surface of the volume to assume the desired shape comprises placing the mixture in a cavity mold that has a surface complementary to the desired shape.

7. The method of claim 2 wherein said causing a surface of the volume to assume the desired shape comprises contacting a surface of the volume with an object that has a surface complementary to the desired shape.

8. The method of claim 2 wherein said excess amount of liquid is the minimum quantity to create a fluent condition by providing a predetermined clearance between the bodies, wherein the clearance permits the introduction of at least two simultaneous slip-planes between geometrically ordered bulk masses of the bodies.

9. The method of claim 2 wherein said liquid component and said bodies are of matching densities.

10. The method of claim 2 wherein said liquid component and said bodies are of differing densities.

11. A method of making a formed shape having a surface with a desired contour, the method comprising:

providing reformable tooling that includes a volume of a reversible state-change mixture in a stable force-resisting state, the mixture having solid and liquid components wherein

the solid component comprises a plurality of uniform solid bodies which are geometrically ordered, packed and nested against one another, and

the liquid component fills the interstices between the bodies;

adding an additional quantity of the liquid component, referred to as the transition liquid, sufficient to provide a clearance volume between the bodies;

exerting pressure forces on the liquid component so as to cause at least two slip-planes to form, within the clearance volume, between geometrically ordered bulk quantities of closely packed bodies in the mixture, thereby causing the mixture to transition to a formable state;

conforming a surface of the volume to a surface of a pattern having the desired contour the desired contour;

extracting the transition liquid to cause the mixture to transition from the formable state to the stable state where the bodies make geometrically ordered, packed and nested contact, with the packed and abutted bodies acting as a solid fill which is resistant to externally imposed forces, thereby providing a stable surface portion of the volume that is complementary to the desired contour;

subsequently conforming a surface of a body of formable material to the stable surface portion of the volume in order to impart the desired contour to the surface of the body of formable material; and

subsequently stabilizing the body of formable material so that the surface of the body retains the desired contour, thereby defining the formed shape.

12. The method of claim 11 wherein, with the transition liquid extracted so that the solid bodies are in a stable configuration with ordered, close-packed contact, the degree of resistance to externally imposed forces depends on at least one tailorable physical

property in the set that consists of body shape, surface contours, elasticity and compressibility, and body surface properties such as roughness, smoothness, and molecular adhesion.

13. The method of claim 11 wherein said liquid component provides sufficient support or buoyancy, cushioning or lubricity to said bodies to create movement of ordered bulk masses of the bodies along slip-planes by liquid pressure differential or through externally imposed forces which displace the transition liquid and the supported bodies along with the liquid.

14. The method of claim 11 wherein said liquid component furnishes adhesion between said bodies while in nested, packed or otherwise stable consolidated contact.

15. The method of claim 11 wherein said liquid component and said bodies are of matching densities.

16. The method of claim 11 wherein said liquid component and said bodies are of differing densities.

17. The method of claim 11 wherein said liquid component transitions from a liquid state to a solid state and back to a liquid state.

18. The method of claim 11 wherein said conforming comprises contacting a surface of the volume with an object that has a surface complementary to the desired contour.

19. The method of claim 11 wherein said mixture is contained within an elastic membrane, and the surface of the membrane has an impression formed in it by pushing an object against the membrane.

20. The method of claim 19 in which the degree of accuracy or irregularity on the surface of a stabilized mass of the mixture is dependent on the relationship between the fineness of the dimensions to be captured, a covering membrane's thickness and conformability, and the size and degree of regular packing order of a state-change mixture's solid bodies.

21. A method of making an object having a surface portion characterized by a desired shape comprising:

providing reformable tooling that includes a volume of a mixture in a formable state, the mixture having solid and liquid components wherein

the solid component comprises a plurality of solid bodies, and

the liquid component fills the interstices between the bodies, and includes an excess amount beyond an amount that would be needed to fill the interstices when the bodies are packed, the excess amount of liquid thus allowing the mixture to be in the formable state;

causing a surface of the volume to assume a shape that is complementary to the desired shape;

extracting the excess amount of liquid to cause the mixture to transition from the formable state to a stable, force-resisting state where the bodies make nested, packed, interlocking or otherwise stable consolidated contact so that a portion of the volume has a stable surface portion that is complementary to the desired shape;

subsequently using the stable surface portion of the volume as a mold to impart the desired shape to the surface portion of material forming the object; and

subsequently reintroducing a sufficient volume of liquid to allow the mixture to transition from the stable, force-resisting state to the formable state.

22. The method of claim 21 wherein said causing a surface of the volume to assume the shape that is complementary to the desired shape comprises placing the mixture in a cavity mold that has a surface characterized by the desired shape.

23. The method of claim 21 wherein said causing a surface of the volume to assume the shape that is complementary to the desired shape comprises contacting a surface of the volume with an object that has a surface characterized by the desired shape.

24. The method of claim 21 wherein said excess amount of liquid is the minimum quantity to create a fluent condition by providing a predetermined clearance between the bodies, which clearance permits the introduction of at least two simultaneous slip-planes between geometrically ordered bulk masses of the bodies at any point in the mixture.

25. The method of claim 21 wherein said liquid component and said bodies are of matching densities.

26. The method of claim 21 wherein said liquid component and said bodies are of differing densities.